

Appendix D.

Recommended Approach for Developing a Network Monitoring Program (NPS 2003)

The recommended approach that each network should take to develop strategy for monitoring natural resources involves seven steps:

1. Form a network Board of Directors and a Science Advisory committee.
2. Summarize existing data and understanding.
3. Prepare for and hold a scoping workshop.
4. Write a report on the workshop and have it widely reviewed.
5. Hold meetings to decide on priorities and implementation approaches.
6. Draft the monitoring strategy.
7. Have the monitoring strategy reviewed and approved.

1. Form a network Board of Directors and a Science Advisory committee.

- A Board of Directors comprised of park superintendents or their designee, the regional I&M coordinator, and the network monitoring coordinator, should be formed to oversee the development of the monitoring strategy for the network. The committee will make decisions regarding the development and implementation of the monitoring strategy, including decisions on hiring, budgeting, and scheduling, and will promote accountability for the monitoring program. The committee should be chaired by one of the superintendents, and all members should have authority to make on-the-spot decisions on personnel, budgets, office space, and commitments of existing park personnel and funding to the monitoring effort. A charter should define the roles and functions of the different members and outline the process to be used to make decisions related to monitoring within the network. The charter must be signed before funding is released to the network. The network I&M coordinator should act as staff to the chair to help arrange meetings and logistics, produce agendas, and coordinate between the Board of Directors and the technical committee.
- A Science Advisory or technical committee comprised of natural resource managers and scientists, including scientists from outside of the NPS who work in the parks and are familiar with park issues, should be formed to provide technical assistance and advice to the Board of Directors. The Science Advisory committee should be chaired by the network monitoring coordinator and will be responsible for compiling and summarizing existing information about park resources and developing the materials needed at the scoping workshop, and will draft the workshop report and monitoring strategy for review and approval by the Board of Directors.

2. Summarize existing data and understanding.

- One of the most important steps in the process of developing a monitoring strategy is the task of identifying, summarizing, and evaluating existing information and understanding of park ecosystems. Much of this needs to be done before the scoping workshop is held.
- To accomplish this task, it is anticipated that most networks will need to hire, assign or contract at least one or two full-time persons (e.g., a Monitoring

Coordinator and data management specialist) and allow at least a year prior to the scoping workshop for this step to be accomplished.

- This step will include a literature review, a review of the Resource Management Plan (RMP), General Management Plan (GMP), and other applicable plans for each park, and an inventory of existing datasets and other information on park ecosystems.
- Superintendents and other park managers should be interviewed regarding the key management issues facing their park and the types of information they need from the monitoring program.
- Current or historical monitoring of natural processes and resources in each park should be summarized, including data from monitoring of fire effects, T&E species, water quality, air quality, physical processes/changes, and other resources. Data sets and the sampling design used should be evaluated to determine whether the monitoring is meeting the needs of park managers and is providing reliable and credible data to help manage the park. Maps showing the locations where monitoring has occurred should be prepared.
- Monitoring that is being conducted by neighboring agencies, partners, and related parks should be identified and summarized to help determine where comparable data sets and sampling protocols exist.
- Where understanding exists regarding cause-effect relationships between environmental stressors and the park's natural resources, or where the linkages among ecosystem components are understood, draft conceptual models should be prepared to help summarize this understanding.

3. Prepare for and hold a scoping workshop.

- A scoping workshop should be held to obtain additional input and peer review of existing information and understanding of park ecosystems from park managers and subject experts from within and outside of the NPS.
- In preparation for the workshop, the monitoring coordinator and technical committee will be responsible for preparing handouts, maps, and presentations of the material summarized in Step #2.
- The monitoring coordinator and technical committee should define the goals and preliminary objectives of the monitoring program prior to the scoping workshop. The goals and objectives should be approved by the Board of Directors.
- Additional material that should be developed prior to the scoping workshop include:
 - Draft lists of important management issues for each park;
 - Draft lists of important natural resources and focal species or processes for each park;
 - Draft lists of known stressors that may cause changes in park resources;
 - Draft conceptual models of portions of the park ecosystem;
 - Draft list of measurable objectives for the monitoring program;
 - Criteria for indicator selection.
- Workshop participants will be asked to review the material prepared for the workshop and provide additional input and understanding, including additional development and modification of conceptual models.

- Participants will also be asked to identify and provide an initial prioritization of potential indicators to be monitored by the network. Include short-term, tactical monitoring as well as long-term monitoring needs.
- Participants will also indicate where appropriate sampling methodologies exist, and where there is a need to develop new sampling protocols for the high-priority indicators that are identified.
- A three-day workshop with facilitated breakout sessions focusing on different components of the park ecosystem is recommended.

4. Write a report on the workshop and have it widely reviewed.

- The results of the scoping workshop should be widely circulated for additional input and comment. It should be sent to all interested parties, including people that did not attend the scoping workshop.
- The additional input provided through the review process should be incorporated into the final version of the workshop report.

5. Hold one or more meetings to decide on priorities and implementation approaches.

- The Board of Directors, based on recommendations of the Science Advisory committee, should meet to make decisions regarding priorities for monitoring and how to implement the monitoring strategy within the network
- The set of indicators that will be monitored by the network should be selected based on the preliminary list of indicators developed during the scoping and review process, and the availability of funding and personnel from the I&M program and other sources (e.g., base funding from parks, partnerships).
- Decisions should be made on which sampling protocols are most appropriate for the network. Where protocols already exist, they may need to be adapted for the particular conditions within the network. In cases where no suitable protocol exists, the committee and managers should decide on an approach for developing these protocols through contracts or technical workshops.
- Staffing issues should be addressed at this meeting. Each network will hire a number of professional-level monitoring specialists and technicians that will be shared by the network parks and decisions should be made regarding the appropriate job series and grade level of these positions and where they should be stationed.
- The Science Advisory committee and Board of Directors should discuss data management and reporting issues. Experience from the prototype monitoring parks indicates that at least 30% of the total resources should be allocated to data management and reporting. A data management plan needs to be developed before the final monitoring strategy is approved.

6. Draft the monitoring strategy.

- A report describing the monitoring strategy and the various tasks and decisions that contributed to the final selection of indicators to be monitored by the network should be written by the technical committee. This document describing the monitoring strategy should include the following:
 - An overview of each park and its natural resources, including a summary of the park's enabling legislation, the park's natural resources in a regional or

national context, and a summary of the important natural resources in each park;

- A summary of the management issues and scientific issues facing each park, including stressors or other agents of change that affect park resources;
- A summary of the understanding of the park ecosystem, including conceptual models developed during the scoping and review process;
- Descriptions of the indicators to be monitored by the network and the sampling protocols that will be used, including justification for why these were selected. The report should also list and describe the indicators that were considered but not selected for monitoring, and the reasons why they were not selected;
- The overall statistical sampling design for the network;
- The staffing plan;
- Data management plan, including how often reports will be generated and who will be responsible for ensuring that results are provided to managers in a timely manner.

7. Have the monitoring strategy reviewed and approved.

- The draft monitoring strategy document should undergo a peer review by the managers and scientists involved in its development and the network Board of Directors, and then be forwarded through the regional office to the Servicewide I&M Program for final review and acceptance before it is fully implemented.

Literature Cited

NPS. 2003. Recommended Approach for Developing a Network Monitoring Program. U.S. Department of Interior, National Park Service, National Monitoring Program, Ft. Collins. <http://science.nature.nps.gov/im/monitor/approach.htm>. Accessed 27 November 2004.